

10-03-18

Aim: SWBAT simplify fractions and convert improper fractions to mixed numbers.

HW: Packet Page 6

Do Now: Write your name on your new packet

Topics Included:**Rational Numbers (Positive and Negative Fractions/Decimals)**

- Comparing and Ordering Fractions
- Converting between fractions and mixed numerals
- Operations with fractions and mixed numerals

Algebraic Expressions

- Simplifying Expressions
- Using the correct "Order of Operations" (PEMDAS) to evaluate algebraic expressions with all types of Rational Numbers(Integers, Positive/Negative Fractions and Decimals)

Fraction Terminology

| Definitions | Example |
|---|---|
| <u>Fraction</u> - A number that names part of a whole. A fraction is also one way to write a ratio. | $\frac{1}{4}$ |
| <u>Numerator</u> - The top number of a fraction; the part | In the fraction $\frac{1}{4}$, the numerator is 1. |
| <u>Denominator</u> - The bottom number of a fraction; the whole | In the fraction $\frac{1}{4}$, the denominator is 4. |
| <u>Proper Fraction</u> - A fraction where the numerator is less than the denominator | $\frac{1}{4}$ is a proper fraction because it is less than 1. |
| <u>Improper Fraction</u> - A fraction that is greater than 1, the numerator is greater than or equal to the denominator | $\frac{5}{4}$ is an improper fraction because it is greater than or equal to 1. |

Aim: SWBAT simplify fractions and convert improper fractions to mixed numbers.

Equivalent fractions are fractions that look different, but have the same value.

One way to find equivalent fractions is to multiply the numerator and the denominator by the same number.

Write three fractions that are equivalent to $\frac{1}{2}$.

$$\frac{1}{2} \rightarrow \frac{1 \cdot 2}{2 \cdot 2} = \frac{2}{4}$$

$$\frac{1}{2} \rightarrow \frac{1 \cdot 3}{2 \cdot 3} = \frac{3}{6}$$

$$\frac{1}{2} \rightarrow \frac{1 \cdot 4}{2 \cdot 4} = \frac{4}{8}$$

$$\frac{1}{2} \times \frac{2}{2}$$

Therefore, $\frac{2}{4}$, $\frac{3}{6}$, and $\frac{4}{8}$ are fractions equivalent to $\frac{1}{2}$.

Write three fractions that are equivalent to $-\frac{3}{4}$.

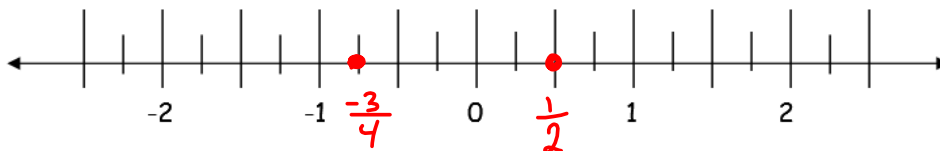
$$\frac{-3}{4} \rightarrow \frac{-3 \cdot 2}{4 \cdot 2} = \frac{-6}{8}$$

$$\frac{-3}{4} \rightarrow \frac{-3 \cdot 3}{4 \cdot 3} = \frac{-9}{12}$$

$$\frac{-3}{4} \rightarrow \frac{-3 \cdot 4}{4 \cdot 4} = \frac{-12}{16}$$

Therefore, $\frac{-6}{8}$, $\frac{-9}{12}$, and $\frac{-12}{16}$ are fractions equivalent to $-\frac{3}{4}$.

Place $\frac{1}{2}$ and $-\frac{3}{4}$ on the number line.



Another way to find equivalent fractions is to divide the numerator and the denominator by the same number.

Write three fractions that are equivalent to $\frac{24}{36}$.

$$\frac{24}{36} \rightarrow \frac{24 \div 2}{36 \div 2} = \frac{12}{18} \quad \frac{24}{36} \rightarrow \frac{24 \div 6}{36 \div 6} = \frac{4}{6} \quad \frac{24}{36} \rightarrow \frac{24 \div 12}{36 \div 12} = \frac{2}{3}$$

$$\frac{24}{36} \div \frac{2}{2}$$

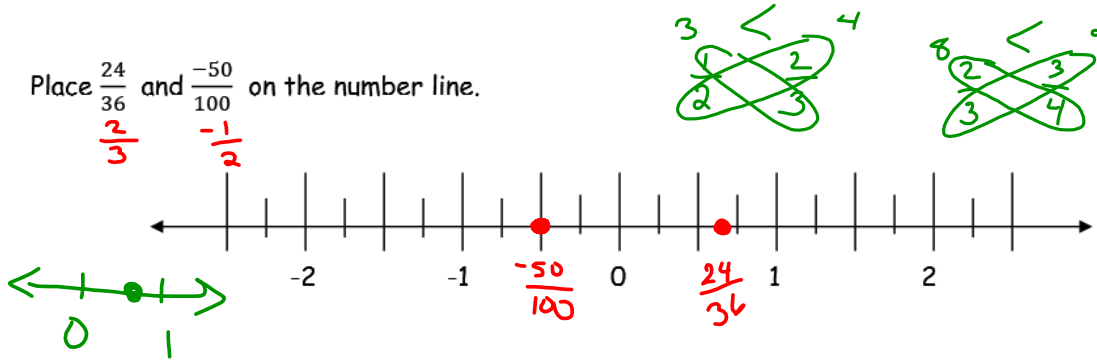
Therefore, $\frac{12}{18}$, $\frac{4}{6}$, and $\frac{2}{3}$ are fractions equivalent to $\frac{24}{36}$.

Write three fractions that are equivalent to $\frac{-50}{100}$.

$$\frac{-50}{100} \rightarrow \frac{-50 \div 2}{100 \div 2} = \frac{-25}{50} \quad \frac{-50}{100} \rightarrow \frac{-50 \div 5}{100 \div 5} = \frac{-10}{20} \quad \frac{-50}{100} \rightarrow \frac{-50 \div 50}{100 \div 50} = \frac{-1}{2}$$

Therefore, $\frac{-25}{50}$, $\frac{-10}{20}$, and $\frac{-1}{2}$ are fractions equivalent to $\frac{-50}{100}$.

Place $\frac{24}{36}$ and $\frac{-50}{100}$ on the number line.



Write two fractions that are equivalent to each of the following.

1) $\frac{1}{4}$ $\frac{2}{8}$ & $\frac{3}{12}$
 $\frac{1 \cdot 2}{4 \cdot 2} = \frac{2}{8}$ $\frac{1 \cdot 3}{4 \cdot 3} = \frac{3}{12}$

2) $\frac{-11}{33}$ $\frac{-1}{3}$ & $\frac{-22}{66}$
 $\frac{11 \div 11}{33 \div 11} = \frac{-1}{3}$

3) $\frac{5}{25}$ $\frac{1}{5}$ & $\frac{10}{50}$

4) $\frac{-2}{3}$ $\frac{-4}{6}$ & $\frac{-6}{9}$

5) $\frac{10}{12}$ $\frac{5}{6}$ & $\frac{20}{24}$

Simplifying Fractions

When 1 is the only number that the numerator and the denominator can both be divided by, the fraction is said to be in **simplest form**. The fastest way to get a fraction into simplest form is to divide the numerator and the denominator by their **Greatest Common Factor (GCF)**.

In other words **the GCF will be the smallest number or a factor of it.**

Find the Greatest Common Factor of 10 and 30. Use it to simplify $\frac{10}{30} \div \frac{10}{10} = \frac{1}{3}$

10: $\overbrace{1, 2, 5, 10}^{\text{factors}}$ $10 \overline{)30}$

Find the Greatest Common Factor of 6 and 33. Use it to simplify $\frac{6}{33} \div \frac{3}{3} = \frac{2}{11}$

6: $1, 2, 3, \cancel{6}$ $\cancel{6} \overline{)33}$
 $3 \overline{)33}$

Find the Greatest Common Factor of 12 and 16. Use it to simplify $\frac{12}{16} \div \frac{4}{4} = \frac{3}{4}$

12: $1, 2, 3, 4, 6, 12$ $\cancel{12} \overline{)16}$ $4 \overline{)16}$
 $\cancel{6} \overline{)16}$

Write each fraction in simplest form.

1) $\frac{24}{36} \div \frac{12}{12} = \frac{2}{3}$

2) $\frac{14}{49} \div \frac{7}{7} = \frac{2}{7}$

3) $\frac{6}{54} \div \frac{6}{6} = \frac{1}{9}$

4) $\frac{8}{64} \div \frac{8}{8} = \frac{1}{8}$

5) $\frac{16}{48} \div \frac{16}{16} = \frac{1}{3}$

6) $\frac{33}{44} \div \frac{11}{11} = \frac{3}{4}$

Converting Improper Fractions to Mixed Numbers

Another way to express the value $\frac{7}{3}$ is to express it as a mixed number. A mixed number consists of a whole number and a fraction. The two are glued together with addition. That means...

$$2\frac{1}{3} = 2 + \frac{1}{3}$$

$$3\frac{3}{4} = 3 + \frac{3}{4}$$

$$-2\frac{1}{3} = -2 + \frac{-1}{3}$$

$$-3\frac{3}{4} = -3 + \frac{-3}{4}$$

Long division is the process used to convert or change an improper fraction to a mixed number. The objective is to find out how many whole times the denominator can go into the numerator. Instead of just writing the remainder as a number, the remainder is written as a fraction.

Express as a mixed number.

$$\frac{7}{3}$$

$$\frac{-9}{4} = -2\frac{1}{4}$$

$$\frac{24}{10} = 2\frac{4}{10} = \boxed{2\frac{2}{5}}$$

$$\begin{array}{r} 2 \text{ r } 1 \\ 3 \overline{)7} \\ \underline{-6} \\ 1 \end{array}$$

$$\begin{array}{r} 2 \\ 4 \overline{)9} \\ \underline{-8} \\ 1 \end{array}$$

$$\begin{array}{r} 2 \\ 10 \overline{)24} \\ \underline{-20} \\ 4 \end{array}$$

$$\frac{7}{3} = 2\frac{1}{3}$$

HOMEWORK

Write each fraction in simplest form.

| | A | B | C |
|----------|-----------------|------------------|------------------|
| 1 | $\frac{16}{48}$ | $-\frac{45}{99}$ | $-\frac{13}{91}$ |
| 2 | $\frac{30}{42}$ | $\frac{84}{140}$ | $\frac{96}{112}$ |
| 3 | $\frac{52}{78}$ | $-\frac{62}{66}$ | $\frac{15}{90}$ |

Convert each fraction to a whole number or a mixed number in simplest form.

| | A | B | C |
|----------|-----------------|------------------|------------------|
| 4 | $-\frac{17}{2}$ | $-\frac{24}{10}$ | $\frac{68}{17}$ |
| 5 | $\frac{98}{32}$ | $-\frac{85}{15}$ | $\frac{162}{24}$ |